



August 18, 2014

Kristine Hansen  
Senior Project Manager  
US Army Corps of Engineers  
300 Both Street, Room 3050  
Reno, NV 89509

**Subject: SouthEast Connector Project –EPA Mercury Study Comments**

Dear Ms. Hansen:

The Regional Transportation Commission (RTC) appreciates the comments from the United States Environmental Protection Agency (USEPA) we received from the United States Army Corps of Engineers (USACE) on August 1, 2014. Attached to this letter are responses to the comments and/or questions stated in USEPA's July 15, 2015 email to your office.

In light of ongoing discussions and inquiries, I would like to highlight some changes to the Section 404 Clean Water Act Permit Application, Appendix C; Mitigation and Monitoring Plan. In the RTC's permit application dated July 19, 2013, a draft Mitigation and Monitoring Plan was included which discussed our proposed plan at that time. The RTC has revised the mitigation design to address these discussions, including mercury accumulation and opportunities for methyl-mercury generation, some of which was provided to the USACE (see response to Item 12 & Attachment 4) in the RTC's February 20, 2014 response to USACE comments on the July 2013 permit application. In light of these design changes, the RTC is providing the following summary of the changes. An updated Appendix C, Mitigation and Monitoring Plan will be provided at a later date.

#### **Butler Ranch Changes**

The project is currently designed such that all permanently wet (e.g., obligate) wetlands are located within the Yori Drain Wetland Complex, discussed later in this letter. Previously, designs had obligate wetlands located within the Butler Ranch reach. Concerns were raised about the deposition of mercury within this area and the potential to generate methyl-mercury in the previously planned obligate wetlands. The current design removed these wetlands in this area. The changes are as follows for Butler Ranch:

- All flood mitigation areas have positive drainage to Steamboat Creek eliminating the conditions that promote mercury methylation.
- The new floodplain/riparian corridor design maximizes the seasonally dry (e.g., facultative) wetland environment with wetland hydroseed, willow stakes and wetland plantings, as indicated in RTC's response to USACE comments (please see Figures 2A and 2B of Attachment 3 to that submittal).

In addition to allowing for positive drainage, a couple of other benefits are realized. Those benefits include:

- The design for overbank conditions within the flood mitigation areas is based upon flows during the spring snowmelt when Steamboat Creek water is colder. The colder water temperature reduces the rate at which mercury can convert to methyl-mercury.



- The overbank water and sediment that may be deposited during larger storm (flood) events will be exposed to sunlight and oxygen. Sunlight has been shown to substantially increase methyl-mercury photodegradation and aerobic conditions limit the potential for mercury to become methyl-mercury.

In summary, the Butler Ranch area was redesigned to reduce the chance of mercury containing sediment from methylating since the mercury containing sediment, that may deposit, will not be exposed to conditions that are conducive to the generation of methyl-mercury.

### **Yori Drain Wetlands Complex**

The Yori Drain Wetland Complex is an approximately 60 acre obligate wetland area north of Pembroke Drive and east of the SouthEast Connector. The eastern boundary of the wetland complex follows the alignment of an underground 72” sewer line. In order to protect the sewer line, the project does not disturb any ground above the sewer line alignment. This creates a physical barrier; i.e. mound of earth, between the Steamboat Creek and the Yori Drain Wetland Complex. The wetland complex’s source of water is the non-mercury contaminated Yori Drain. The Yori Drain is the only outlet of Virginia Lake and is essentially an urban run-off drainage feature. The design of the Yori Drain Wetland Complex provides significant water quality benefits downstream along Steamboat Creek and the Truckee River. As the Yori Drain water enters the wetland complex, the water is naturally treated through contaminant uptake within the vegetation, and contaminant digestion from the invertebrates that will reside within the wetland complex.

It is important to note that the wetland complex is at a higher elevation than Steamboat Creek. This higher elevation ensures that no Steamboat Creek water is able to enter the Yori Drain Wetland Complex during normal seasonal high water flows. If a flood event were to occur, flood modeling analysis shows that depending on the flood event, the wetland complex will be filled with either Truckee River back flow water or water from the Yori Drain itself. In other words, even during a flood event when Steamboat Creek water would be able to reach the wetland complex, the wetland complex will already be filled with non-mercury containing waters. This will significantly reduce the chance of mercury to be deposited within the obligate wetland complex. The occurrence and distribution of mercury is deposited within and upstream in the Butler Ranch area, which is where the project team has redesigned aspects of the mitigation to reduce the potential for mercury methylation as previously stated in this letter.

Should you need any clarification on what we provided, please do not hesitate to contact me at (775) 332-2137 or [goksol@rtcwashoe.com](mailto:goksol@rtcwashoe.com). We look forward to continuing to work with the USACE as the process advances towards a decision regarding the Section 404 Clean Water Act Permit application.

Sincerely,



Garth Oksol, P.E.  
Project Manager

PGO/mak

Attachment: EPA Comment Response Table  
Figure 2A-South Butler Ranch and Figure 2B-North Butler Ranch

xc: JeanMarie Stone, NV Department of Environmental Protection



**EPA Comments on Mercury Availability and Methylmercury Generation Potential in SouthEast Connector Floodplain**  
 (Ref: Public Notice SPK-2010-01058, SEC, NV) Technical Memorandum,  
 SouthEast Connector Phase 2

Email Comments from Chris Eckley; transmitted to USACE July 15, 2014; received August 6, 2014

Comment	Comment Response
<p>Regarding: "In addition to elemental mercury present in the soils and sediments, mercury is also present in the water column in the form of Total Suspended Sediments (TSS) and to a far lesser extent as dissolved Methylmercury (MeHg)"</p> <p>Comment: While it was elemental Hg (ie. Hg0) that was originally used as part of the mining operations, has data been collected on the Hg in soils and sediment to confirm that it is still in this form? Or are they just assuming that the Hg has stayed in the same form? It may be the case that there is still Hg0 in the soils/sediments, but it may also be likely that oxidation/volatilization has occurred over the last century resulting in a significant amount of the Hg present as Hg2+. In general, elemental and oxidized species of Hg behave quite differently in the environment. Perhaps not particularly important critique in this particular memo, but in general, if they are going to make statements regarding the specific form/speciation of Hg contamination we should make sure they have data to back this up.</p> <p>If it is the case that most Hg in the water is associated with suspended particles, then the Hg bound to the particles would be an oxidized form (ie. Hg2+) and not elemental Hg (Hg0) which would not bind to suspended sediments.</p> <p>The sample information they reference from Table 1 doesn't provide any supporting information regarding THg in the water being associated with particulates, so I'm not sure why they included this table.</p>	<p><i>Analysis of this memorandum in the absence of the more detailed permit documentation is not reflective of the level of analysis that has been conducted for this project. This memo was requested by the USACE to provide a broad discussion of the physical mechanisms of Hg deposition within the floodplain and what level of concern should they have in the overall project.</i></p> <p><i>As indicated in the March 24, 2014 memorandum, its development and distribution originated following a lengthy tele- and video-conference on March 12, 2014 discussing sedimentation and potential methylmercury generation during out of bank events. This memo represents a follow-up submittal based on agency (e.g., USACE, USEPA, NDEP and USFWS) understanding and review of extensive design specifications, plans and detailed technical studies that have been produced since February 2013. CH2M HILL recognizes that this is not an analysis based on a broad data collection, but developed this at the request of the USACE to frame the discussion of what potential overbank events may mean with respect to mercury deposits within the floodplain.</i></p> <p><i>In response to the comment, previous testing of mercury did not include speciation. The TM does not claim that mercury that remains is Hg0 (elemental) and, while the most common forms are Hg0 and Hg2+ in freshwater systems, it is most likely that Hg2+ is dominant as it forms inorganic and organic complexes. In context of the methylmercury issue, Hg2+ is only a problem (to form methylmercury) if anaerobic conditions persist. In aerobic conditions, Hg2+ would form cinnabar or other complexes.</i></p>

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<p>Regarding: "Using the total Hg and total suspended sediment (TSS) values presented in Table 1,"</p> <p>Comment: Why was this single grab sample from Oct 2008 chosen for these calculations? Is this the only THg concentration data available? What were the hydrological conditions like when this sample was collected...i.e. baseflow or stormflow conditions. This information is very important since this singular value is being used to calculate an annual deposition. THg concentrations can change by an order of magnitude between baseflow and stormflow conditions, therefore it is critical that more information be provided on the Oct 2008 sample used for annual extrapolation.</p>	<p>Additional data regarding baseflow versus stormflow conditions were not available from the database, with 23 of 25 measurements from Steamboat Creek between 2001 and 2011 reporting concentrations of &lt;0.2 ug/L and 32 measurements of TSS averaging about 27 mg/L. This single grab sample is representative of water quality conditions based on NDEP's STORET database. The total Hg and TSS values (Table 1) and the mean of the daily mean values (Attachment A), which include the flood events of 1997 and 2004, conservatively estimate the volume of water that could overbank monthly and the mass of Hg that could be deposited on the floodplain. In addition, the mercury samples available for review were listed as &lt;0.2 ug/L and the analysis uses a more conservative 0.2 ug/L value.</p>
<p>Regarding: " This estimate assumes that all (1) suspended sediment contains an average of 0.2 ug/L total mercury"</p> <p>Comment: The concentration of Hg associated with the suspended sediment would be in ug/mg not ug/L. Or is the assumption being made that 100% of the 0.2 ug/L is bound to particles? The wording here is a bit unclear.</p>	<p>The discussion intended to assume that 100% of the 0.2 ug/L is bound to sediment particles, which is a conservative assumption given that Hg concentrations are routinely reported at &lt;0.2 ug/L in this and other portions of Steamboat Creek. Additionally, the system is designed to positively drain back to the creek, therefore non-sediment bound forms of Hg have a low likelihood of depositing through processes of sedimentation.</p>
<p>Regarding: "For demonstration purposes we have made this assumption to provide the worst case scenario based on available data."</p> <p>Comment: They are suggesting that they are being conservative by overestimating the amount of Hg deposited. However, if the 0.2 ug/L value they are using was measured during baseflow conditions and the stormflow concentrations are much higher, then this calculation no longer is a "worst case scenario" but could be an underestimate of deposition. More information on the Oct 2008 sample could help clarify this.</p>	<p>Per the response above, Hg concentrations are routinely reported at &lt;0.2 ug/L in Steamboat Creek. Information related to baseflow versus stormflow conditions are not available from the reviewed databases. Additionally, the majority of stormwater in this system does not come from the impacted reach of Steamboat Creek but from the western tributaries that are not known to have elevated levels of Hg. Depending upon the location of a storm and input of runoff to the system, the concentration of Hg could be much lower.</p>

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Comment	Comment Response
<p>Regarding: "This design reflects a seasonal out-of-bank flow regime that allows for the inundation of the floodplain for several weeks; generally early in the season when temperatures are low, which minimizes the methylation rate as a function of biological metabolism."                      Comment: Not clear what season they are referring to. This should be specified. Important to note that methylation in lakes often occurs at ~4 C sediments underlying a hypolimnion. While it is true that higher temperatures can increase MeHg production, the assumption they are making that methylation will be minimal when temperatures are low (they should specify what they mean by low) is not warranted. There are many studies of high MeHg production occurring at a few degrees C. I assume the "low" temperatures being referred to in this memo are quite a bit higher.</p>	<p><i>Temperature is just one contributing factor to the formation of methylmercury. The memorandum does say that the formation is minimized or stopped at low temps. There are a combination of factors (e.g., low temperature, aerobic conditions, well-draining soils, positively-draining wetland design, photodegradation, etc.) that limit the methylation process, all of which have been considered in the design of the riparian and floodplain areas. Additionally, where Hg will not be completely removed (where it extends below the bottom of design elevation), these areas will be over-excavated one to one and one-half feet and covered with clean soil to further reduce the potential for methylation.</i></p>
<p>Regarding: "Therefore after 100 years it can be assumed that approximately 43 kg of mercury could be deposited on the floodplain."                      Comment: Here they're making an estimate over a 100 year time frame based on a concentration from 1 single grab sample. This seems like a huge over extrapolation of an extremely limited measurement.</p>	<p><i>The TSS and total Hg values do come from the one grab sample, the values for which do not change significantly over time (e.g., 23 of 25 total Hg measurements from Steamboat Creek between 2001 and 2011 report &lt;0.2 ug/L and 32 measurements of TSS average about 27 mg/L.). Because the calculations include the flood events of 1997 and 2004, the overall volume of water and sediment deposited overbank does represent a conservative estimate. Please remember that this discussion was provided at the request of the agencies to get the USEPA and USACE on the same page as we talk about what their respective floodplain concerns were. We recognize that the hydrologic input and breadth of data presented in the memorandum do not constitute any level of certainty. This was provided to gain a better understanding in the overall discussion.</i></p>

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Comment	Comment Response
<p>Regarding: "This is a relatively small risk of future potential sources for methylmercury considering that the proposed project will permanently remove approximately 10,000 kg of Hg from future exposure to the natural and human environment."</p> <p>Comment: presumably only a very small fraction of the 10,000 kg is currently in a position where it is available for methylation? This is unclear. If the majority of the 10,000 kg is underground, it may have very limited potential to become methylated, whereas the much smaller amount of Hg deposited from the river may have a much higher potential to be methylated. Their bulk comparison of 43 to 10,000 kg seems a bit misleading.</p>	<p>To clarify, Hg soil will be removed from existing and historic channel banks where the mercury has been deposited, much of which is not available for methylation (e.g., remains in a subsurface/encapsulated environment). (See 404 Permit Application Appendix E, Rubik Environmental mercury study). While it is understood the mercury that is deeper in the soil mass is not readily available to the exposed environment presently, that does not take into account the exposure to groundwater and further channel erosion that occurs annually and certainly occurs during flood events. The relatively higher concentrations of Hg that reside in near surface soil is available for erosion into Steamboat Creek and potential methylation. The Final Design Plans specify removal all encountered Hg soil to 10 mg/Kg and construction of riparian and floodplain areas that receive overbank water &gt;16 cfs in the North and South Butler Ranch areas (south of Mira Loam Drive). These areas will be graded to positively drain back to the creek. The large wetland complex on the north end of the project will be sourced from the Yori Drain that does not contain Hg. The Yori Drain and this wetland complex will be higher in elevation than Steamboat Creek which will prevent Steamboat Creek flow from routinely entering the wetland complex. The comparison is not misleading – a significant mass of mercury is being removed, with only a small fraction of that mass being re-deposited via overbank sedimentation, none of which is likely to methylate based on the design. This conclusion is consistent with what is noted by the USACE (e.g., "The proposed project is not expected to increase the rate of mercury methylation...") in their August 1, 2014 request for USFWS consultation.</p>
<p>Regarding: " Therefore the best action that can be taken to limit the existing and future methylation potential and associated exposure of the system biota to MeHg is to stabilize the Steamboat Creek system through isolation of the existing Hg as proposed"</p> <p>Comment: I don't necessarily disagree with this conclusion, I just don't think they have much information to support this conclusion.</p>	<p>As indicated above, the March 24, 2014 memorandum was intended to augment the substantial data/information already provided in the July 19, 2013 Section 404 Permit Application and subsequent comment responses and memoranda. There is ample information to support the conclusion, most of which was not repeated in this memorandum.</p>

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<p>Regarding: Later in the same sentence they state " reduce the energy of the system through reconnection of the channel to the floodplain"                      Comment: Its unclear how reducing the energy of the system will limit methylation. This should be better explained. In general, I would think that reducing the energy of the water would increase the potential for deposition, development of anoxic conditions, and methylation.</p>	<p><i>Currently Steamboat Creek is highly incised with near vertical banks that erode on an annual basis. Reduced energy will result in reduced sediment transport downstream of the project, which allows for less overall bank erosion and erosion of areas that may contain mercury. The system will be engineered to be better controlled, and areas prone to overflow (e.g., flood volume mitigation areas) are being designed (1) to infiltrate overbank flows, (2) positively drain back to the creek to minimize the presence of standing/stagnant water, and (3) to maintain oxygenated inflows, all of which prevent anoxic conditions and limit the potential for methylation. As noted previously, the wetland complex at the north end of the project is isolated from Steamboat Creek and will be sourced from the Yori Drain, which does not contain Hg.</i></p>









